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imagery analysis report

The Xia, China's First SSBN (S)



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**THE XIA, CHINA'S FIRST SSBN (S)**

1. (S/D) The Xia—China's first nuclear-powered, ballistic missile submarine (SSBN)—has remained in the launch dock at Huludao Naval Base Shipyard and Port Facility [ ] since being launched in late April 1981 (Figure 1). The submarine has been under construction since the mid-1970s; initial launch preparations were identified in late 1980.

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2. (S/D) The Xia is a conventionally designed, double-hulled SSBN with a modern teardrop shape. The submarine is [ ] long; it has a waterline length of [ ] and a beam of [ ]. The submarine features a large sail with sailplanes; a missile bay covered by a raised turtleback; a single, vertical rudder; two horizontal stern diving planes; and a five-bladed screw mounted on a centerline shaft. The placement of the missile bay aft of the sail follows the design of every modern SSBN with the exception of the Soviet Typhoon-class SSBN. In the design and construction of the Xia, the Chinese have relied heavily on technology used in building the Han-class, nuclear-powered attack submarine (SSN). The developmental cycle is similar to that once used by the United States in converting an established SSN design for an SSBN. Table 1 provides a dimensional comparison of the Xia and Han. The similarities in shape and size suggest that the Xia is basically a Han with a [ ] missile bay inserted aft of the sail. Undoubtedly, internal modifications were made to accommodate the extra equipment required to operate a submarine-launched ballistic missile (SLBM) system.

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**Table 1.**  
**Comparison of Xia and Han Dimensions (in Meters)**

*This table in its entirety is classified SECRET/NNINTEL*

Dimensions	Han SSN	Xia SSBN
Length overall		
Waterline length		
Maximum beam		
Bow to front of sail		
Sail, height		
Sail, width		
Sail, length at top		
Sail, deck-level length		
Sailplanes		
Stern diving planes		
Turtleback, total length		
Turtleback, back of sail to taper		
Turtleback, height from deck		
Turtleback, width		
Vertical rudder height		
Vertical rudder length		
Screw diameter		

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3. (S/D) Assuming that no unusual problems are encountered during the fitting-out cycle, the Xia could possibly depart for sea trials by late 1982. However, if the Xia has fitting-out problems like the Han SSN's, the commencement of sea trials could be delayed.

4. (S/D) Many external access openings in the Xia were identified shortly after the launch. A [ ] opening was observed in the outer hull immediately aft of the bow (Figure 1). This access may be related to torpedo/weapons loading or may possibly serve as an access to a bow sonar. Two probable personnel access hatches/escape trunks have been identified—one forward of the sail and the other aft of the turtleback (Figure 1). The sail has a significantly larger number of penetrations through the sail cap than does that of the Han. While the Han's sail cap has a bridge and four antenna/mast openings, the Xia's sail cap (inset, Figure 1) has a bridge, two rectangular openings, and seven circular antenna/mast openings.

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5. (S/D) The turtleback (Figure 1) begins just aft of the forward edge of the sail, slopes up to enclose the [ ] missile bay, and tapers down to merge with the outer hull. The turtleback is [ ] long. The aft slope of the turtleback was removed shortly after the launch, revealing a large, open area where a very-low-frequency (VLF) antenna will probably be located. No housing for this type of antenna was observed, but the housing could be installed at a later date. The external control surfaces, consisting of two sailplanes, a single vertical rudder, and two horizontal diving planes, are conventionally configured and are similar in size to those of the Han. A five-bladed screw, [ ] in diameter with a [ ] meter maximum blade width, is mounted on a centerline shaft.

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6. (S/D) After its rollout and launch in the launch dock, the Xia was placed on keel blocks to begin fitting-out. On [ ] a single missile tube outer door over the number six port missile tube was 1 meter beneath the deck level (Figure 2). The outlines of 11 additional missile tube outer doors could also be seen. Twelve missile tubes were confirmed on imagery of [ ] (Figure 3). The missile tube outer

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doors, the missile deck cowling, and a trapezoidal plate from the aft slope were removed and placed in a temporary storage area adjacent to the dock (Figure 4). The missile tubes are arranged in two rows of six along the centerline of the submarine. The tubes' center-to-center distance athwartships is [ ] 25X1 and the center-to-center distance fore and aft is [ ] 25X1. At the time of the launch, cylindrical covers were atop all the missile tubes (Figure 4). On [ ] the tops of two cylindrical covers were removed, 25X1 revealing an inner missile tube diameter of [ ] Figure 3). The remaining cylindrical covers were 25X1 removed as work progressed on the submarine; by [ ] all covers had been removed. The primary 25X1 reasons for the covers were probably environmental and worker protection. In addition, a canvas-covered framework had been erected by [ ] to protect the missile bay. 25X1

7. (S/D) The dimensions and configuration of the missile tubes on the Xia are consistent with the missile tubes installed in the Golf ballistic missile submarine (SSB). The Chinese have installed a missile launch system on the Golf that uses a launch tube that fits inside the missile tube. The launch tube on the Golf has an internal diameter of [ ] and an external diameter of [ ]. The launch tube can be removed from the missile tube, whereas the missile tube is an integral part of the submarine. The internal diameter of the missile tube on the Golf is [ ]. Mensuration of the number four port missile tube on the Xia on [ ] revealed an inner diameter of [ ]. This measurement, when compared to the previous [ ] diameter for the missile tubes, indicates that the Xia carries a launch tube compatible with those on the Golf. 25X1

8. (S/D) Missile tube muzzle caps and locking rings, which were not installed on the submarine prior to launch, had begun to arrive at dockside by [ ] (Figure 4). The muzzle caps and locking rings are designed to fit atop the missile tube and to seal the tube. Four muzzle caps and locking rings were seen on that date, and on [ ] a maximum of 10 muzzle caps and locking rings were present. The muzzle caps are [ ] in diameter, and the locking rings have a [ ] inner and outer diameter, respectively. The muzzle caps have a twin-arm hinge on one side that allows the cap to swing open, away from the tube. The muzzle caps and locking rings were installed shortly after the installation of the canvas cover over the missile bay. All of the caps were in place on [ ] (Figure 5). However, six muzzle caps had been removed by [ ] and the remaining six caps had been removed by [ ]. The 12 missile tube outer doors were placed over the open tubes. The initial placement of the muzzle caps on the missile tubes was to ensure a proper fit. The caps were then removed to allow additional work on the interiors of the missile tubes. 25X1

9. (S/D) Access to the engineering and reactor space was identified just after the missile bay deck plating was removed. The pressure hull plug and the reactor access panel were removed and placed in the open storage area on the quay, and a square enclosure was placed around the access opening (Figure 6). The access opening is at least [ ] long and [ ] wide. No equipment or structures were visible in the opening. The distance from the midpoint of the opening to the stern is [ ]. The reactor access opening on the Han is also [ ] from the stern. 25X1

10. (S/D) Preliminary fitting-out in the engineering and reactor spaces probably began shortly after launch and continued through the rest of the year. The only interruption in fitting-out was caused by the launch of two small barges between [ ]. Four small, curved objects (Figure 6), which had been removed from the engineering/reactor area, were observed in the temporary storage area adjacent to the dock. The objects have an inner and outer chord of [ ] respectively, and are [ ]. These objects probably function as internal braces or stiffeners in the submarine. Four similar objects were observed during the fitting-out of Han SSN unit 2. These objects were not reinstalled in the second Han until after the reactor was fueled. 25X1

11. (S/D) The nuclear submarine fitting-out barge (Figure 7) had been moved alongside the Xia by [ ]. The barge was previously used in fitting-out both Han SSNs. The fitting-out barge remained in the dock through the remainder of the year, and numerous pieces of equipment were observed on board, including two large, cylindrical, possible dockside waste containers (Figure 7). The possible waste containers were also used during the fitting-out of Han unit 2. In addition, the support tanks used during the fitting-out cycle arrived at dockside (Figure 5). The four light-toned tanks that were used for liquid storage support during reactor startups for both Hans were not installed aboard the fitting-out barge. These four tanks were installed aboard a smaller barge (Figure 7), which will serve as a permanent platform for the tanks. The removal of the tanks from the fitting-out barge frees additional space for equipment in the barge. Two of the tanks probably provide emergency coolant for the reactor, and the remaining two tanks probably provide backup emergency coolant storage capacity. 25X1

### Imagery Analyst's Comments

12. (S/D) The launch of the Xia SSBN was the culmination of a long-awaited construction program that started in the early 1970s. Very few surprises were noted in the design or weapons system. The design progression from the Han SSN to the Xia SSBN appears to have been done in a very logical manner. Like both Han SSNs, the Xia will require extensive work in the reactor and engineering spaces. The reactor access panels of all three submarines were removed shortly after launching, and a considerable amount of time was spent on work in the reactor and engineering spaces; therefore, it is believed that neither the Han SSNs nor the Xia was launched with a fueled reactor. The increased attention that is given to this area on the submarine is probably a direct result of the problems that plagued the first Han. The Chinese have experienced problems with the integrity of the welds in the reactor area and were forced to replace the

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two steam generators on that submarine. This problem and others encountered as a result of poor metallurgical technology are the probable reasons for the extensive amount of work and time spent in fitting-out. As the Chinese become more experienced in the construction of nuclear-powered submarines, it is anticipated that the problems that plagued the early units will be solved, resulting in a decrease in fitting-out time.

13. (S/D) Although the Xia initially appeared to be incomplete when launched, the fitting-out process has progressed very smoothly. The submarine is externally complete except for the installation of the muzzle caps, upper portions of the turtleback, and missile bay deck. Additional work on internal machinery and hardware will probably continue through the early part of 1982 and could possibly be completed by mid-to-late 1982. Upon completion of the internal fitting-out, the reactor will be fueled, and the Xia will be prepared for its initial sea trials. The sea trials and early shakedown cruises will probably take place at Xiaopingdao Submarine Base [ ] the site of the Han sea trials. The base will be the loading facility for the SLBMs that are expected to be stored at the nearby Xiaopingdao SLBM Support Facility [ ]

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14. (S/D) The missile for the Xia is the WU-1 SLBM, currently undergoing land-based flight tests at Wuzhai Missile Test Complex [ ] Three test flights of the WU-1 SLBM have been attempted from Wuzhai, two of them in 1981 and the most recent on [ ] test was considered to be the first successful test flight of the WU-1 SLBM and the first launch from the A2 silolike position. The silolike launch position simulates the underwater launch of an SLBM from an actual launch tube. In addition, further surface launch tests of the WU-1 missile are expected in order to prove that the missile can achieve the required range and accuracy. Simultaneously with this activity at Wuzhai, indications of possible SLBM at-sea testing involving the Golf SSB were observed at Xiaopingdao. A continuation of this activity could result in the first at-sea launch of a WU-1 SLBM in 1982.

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**REFERENCES****IMAGERY**

(S/D) All applicable imagery acquired from [ ] was used in the preparation of this report.

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(S) Comments and queries regarding this report are welcome. They may be directed to [ ] Asian Forces Division, Imagery Exploitation Group, NPIC, [ ]

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